MASSACHUSETTS RATEPAYERS WIN WITH CLEAN ENERGY PARTNERSHIP AT WATER FACILITIES

This Cost / Benefit Analysis was done in partnership with the American Water Works Association and the Policy Navigation Group

Overview

A partnership between the Massachusetts Department of Environmental Protection (MassDEP) and the public water and wastewater sector on clean energy projects has created a number of highly successful clean energy projects. This is helping the water sector transform itself to act as a clean energy resource to their communities while meeting its fundamental mission to provide safe, clean water.

Despite the availability of programs that incentivize clean energy investments, many efficiency and renewable energy projects are not being implemented due to lack of available capital. Many small clean energy projects are not implemented immediately, but are deferred for years, until they can be bundled with higher cost projects requiring additional capital. To move projects off the shelf and to begin saving energy and generating clean energy, MassDEP, under its Clean Energy Results Program (CERP) in 2014, partnered with the Massachusetts Department of Energy Resources and the Massachusetts Clean Energy Center to offer a "Gap Funding" grant program designed to leverage the funding from other available programs.

The Gap Funding program awarded 21 water and wastewater facilities[1] more than $1.7 million to help fund 30 clean energy projects. These projects leveraged nearly $2 million in utility incentives to install $10.9 million in clean energy improvement projects. The projects will reduce enough electricity to fully heat and power 897 Massachusetts homes every year for nearly 15 years. The resulting avoided greenhouse gas emissions is equivalent to removing 5,369 cars from the road for those 15 years.

[1] 22 total grants were awarded. One facility subsequently declined the award.

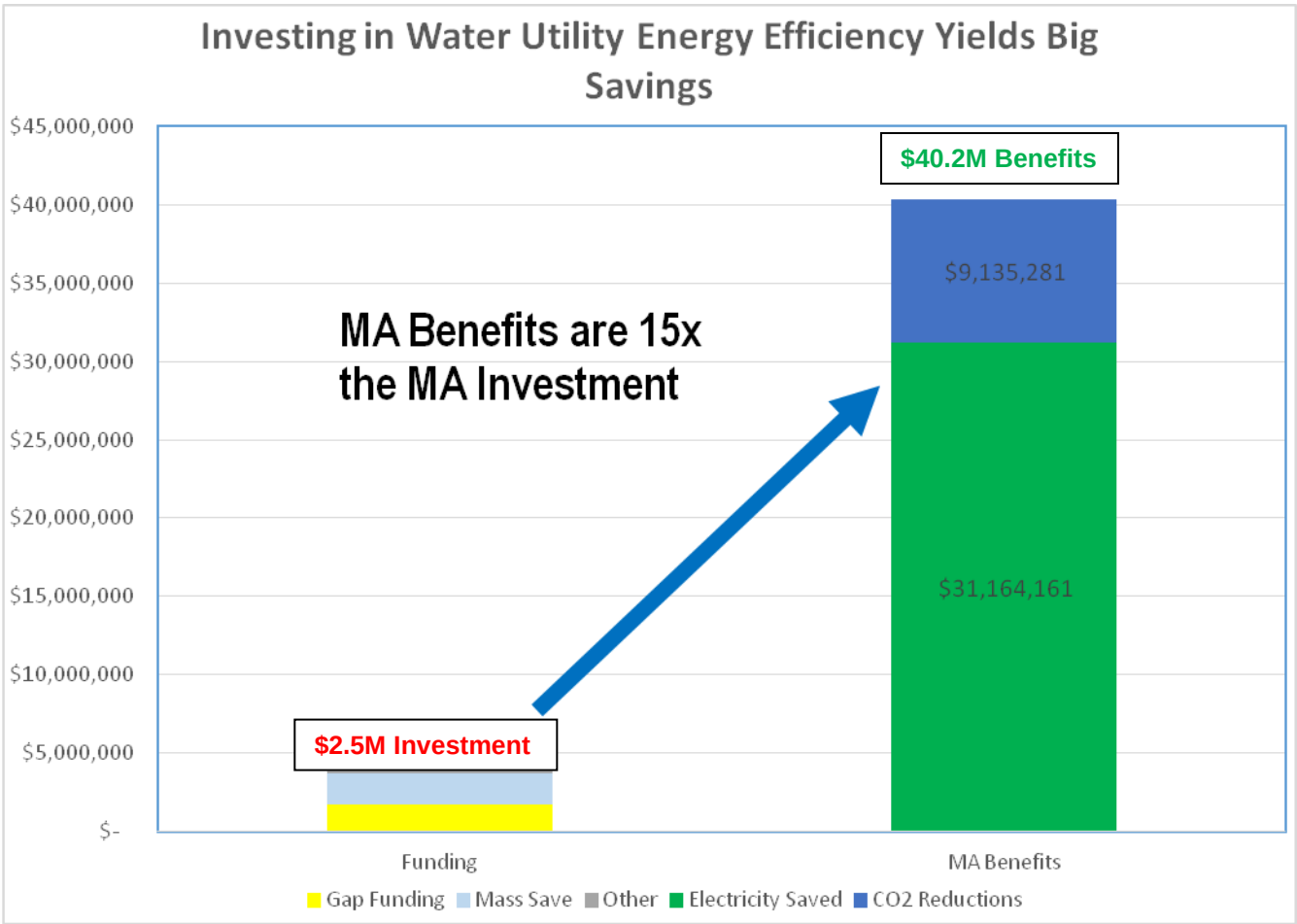
Investments in clean energy by water and wastewater facilities bring significant benefits directly to the facilities and their ratepayers as well as helping realize larger societal benefits. A key to helping this sector move forward with these projects is technical assistance to bundle various funding sources. Due to a lack of available capital, it may also be necessary to provide a small amount of supplemental funding, the "Gap" funding, to move these projects forward.

Results and Benefits

- **Gap Funding Grants Primarily Used for Energy Efficiency**

  In total, a $2.5M Massachusetts investment (state 'Gap' funding and Mass Save®) in 2014 will result in over $40.2 M of public benefits over the next 15 years – yielding $31.1M of energy savings for municipal water facilities and $9.1M of public environmental benefits. The benefit / cost ratio is 15.6 to 1.

  Of the MA Gap Funding grants, 17 of 21 offered funding to reduce energy consumption at water utilities entirely through energy efficiency projects. Two grants were solely for electricity generation through solar PV installations, one grant included both efficiency projects and a solar PV installation and one grant was for a combined heat and power installation.



- **Water and Wastewater Facilities Accrue Cost Savings**

  $1.1 million in projected annual cost savings from avoided electricity usage will accrue directly to the public water and wastewater utilities, to their ratepayers, and to society at large through associated reductions in greenhouse gasses. 95% of these cost savings are from the energy efficiency projects.

- **Clean Energy Projects Save Ratepayers Money**

  Overall, the projects had a total project benefit-cost ratio of 3.6:1[2] without incentives-- for every $1 invested in these clean energy benefits, $3.60 in benefits will accrue to society, the water and sewer facilities, and thus to their ratepayers. These clean energy projects simply make sense.

- **Gap Funding Grants Connect All Funding Sources**

  The grants connected a variety of funding sources, including incentives from the Mass Save® and municipal lighting plant energy efficiency programs. Other grant programs, such as the Green Communities Designation and Grant Program, also contributed funds. Each of these public funding sources ultimately derives from electric ratepayers through the Regional Greenhouse Gas Initiative, the System Benefit Charge, and electricity rates.

- **Cost Savings From Clean Energy Projects Don't Stop at the Facility**

  The total societal benefit from these projects is valued at more than $40 million. These benefits include the direct cost savings, the value of avoided electricity transmission and distribution upgrades, the value of avoided compliance costs with applicable and foreseeable environmental regulation, such as emission controls on primary and hazardous air pollutants, the value of reductions in greenhouse gasses, and avoided costs due to reductions in wholesale market prices of capacity and energy.

- **Water and Wastewater Facilities Are An Outstanding Investment for Energy Efficiency Program Administrators**

  Cumulatively, the funded energy efficiency projects[3] will save more than 15 million kWh and 618,000 therms of natural gas annually. They received a total of approximately $913,000 in energy efficiency incentives from Mass Save® and municipal lighting plants. The overall benefit-cost ratio for the efficiency incentives is over 15:1, meaning that for every $1 provided in incentives, $15 in benefits will accrue to the electric ratepayers funding the energy efficiency programs. For energy efficiency Program Administrators, water and wastewater facilities represent an outstanding use of public energy efficiency funds.

- **Clean Energy Project Cost Savings Can Mitigate Rate Increases**

  Massachusetts and the nation have aging water and sewer infrastructures with substantial deferred investment needs. Despite the water and wastewater facilities' best efforts at saving costs, there is no guarantee that water and sewer rates will not increase when the infrastructure requires upgrades. Cost savings from clean energy projects will help minimize any potential cost increases.

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[2] See the methodology in the Attachment

[3] Excludes the combined heat and power project

Analysis Methodology

1. We computed the financial value of the stream of reduced electricity consumption at the water system end user. The size of this financial value depends on the magnitude of the electricity saved and the expected life of the energy efficiency equipment. The present value of this financial stream depends on the discount rate and on the avoided cost of electricity.
2. To estimate the size and present value, we generally use the approach required to analyze energy efficiency investments in the Department of Public Utilities' guidelines.[4] Regulated electric utilities must follow these guidelines to evaluate the cost-effectiveness of their rate-payer funded energy efficiency programs.
3. Our primary resource for executing the guidelines' requirements is the Avoided Energy Supply Cost Study, a biennial report by a joint committee of public utility regulators, electricity utilities, and other experts in New England that establishes common values for the New England states.[5]
4. In this report, the study group finds the following major benefits of end user energy efficiency:
    - Avoided costs due to reductions in quantities of resources required to meet electric demand and annual energy. These avoided costs also include a reduction in the cost of renewable energy incurred to comply with the applicable Renewable Portfolio Standards ("RPS"). The avoided costs also include compliance costs with applicable and foreseeable environmental regulation, such as emission controls on primary and hazardous air pollutants.
    - Environmental costs that are not embedded in energy supply costs are also avoided due to a reduction in the quantity of electric energy generated. The primary non-embedded environmental cost is emission of carbon dioxide from energy generation, transmission, and delivery.
    - Some local transmission and distribution infrastructure costs are avoided.
    - Avoided costs due to reductions in wholesale market prices of capacity and energy occur as the lower requirements for electric demand and annual energy are met by lower-cost marginal resources.
5. We used the 2013 values for the above parameters from the Avoided Cost Study. Since some information is utility-specific, we used representative values for Massachusetts for all projects. We use an avoided transmission and distribution cost from National Grid's Massachusetts operation.
6. We used the 2013 Avoided Cost Study, as opposed to the more recent 2015 study, since the gap funding program was in the 2013 planning period.
7. We used the 2013 Report's discount rate of 1.43 percent to discount future electricity savings.
8. For an energy measure's useful life, we used values in the State of Michigan's Energy Measure database for the applicable technologies

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[4] See Section 3.4.4 in the Guidelines, adopted by the DPU here: http://www.mass.gov/eea/docs/dpu/electric/dpu-11-120-a-phase-ii.pdf. January 31, 2013.
[5] Avoided-Energy-Supply-Component (AESC) Study Group, *Avoided Energy Supply Costs in New England: 2013 Report*, Synapse Energy Economics, Inc., July 13, 2013.